

# *Miniature/Microminiature Electronic Repair Program*

Strategic Planning Conference 2001

# *Presenter*

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# *Topics*

- Overview
- Tools and Equipment
- Technical Documentation
- Training and Training Support
- Summary

## *Overview*



# *Mission*

Provide the required:

- Tools
- Techniques
- Training
- Support

to ensure that 2M Electronic Repair can and will be done at the lowest maintenance level practical!

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *2M Roles*

Crane is:

- Technical Direction Agent
- Acquisition Engineering Agent
- In-Service Engineering Agent
- Training Support Activity
- Certification Agent

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Points of Contact*

## 2M Project Office Naval Surface Warfare Center Crane (Code 6083)

Gary Latta	Project Manager	812-854-1973
Craig Bennett	Logistics	812-854-2087
Peggi Blakley	Technical Direction	812-854-2086
Ken Cease	Database & Web Page	812-854-3237
ETC Brett Estes	Fleet Liaison	812-854-6551
Andy Ganster	Training & Equipment	812-854-1194
WP Norris	Training & ESD	812-854-3192
FTC John Preston	USCG 2M Liaison	812-854-6210
	FAX: 812-845-3855	

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Web Page*

- <http://www.crane.navy.mil/2m/>
  - Provides general information
  - Publicly accessible
  - Security limits availability of data

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Scope of the Program*

- US Navy
- US Marine Corps
- US Air Force
- US Coast Guard
- US Army

*Overview*



2M Miniature/Microminiature Electronic Repair Program



# *NAVAIR Involvement*

- Crane has been established as the *Lead Maintenance Technology Center* for Electronic Repair

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Goals*

- Influence development of standards
- Keep technical documents current
- Support curricula development & maintenance
- Keep repair equipment current
- Fleet support

*Overview*



# *Objectives*

- Establish Government/Industry interface for repair
- Update Certification Plan
- Update 2M curricula
- Update Standard Practices Manual
- Upgrade Technical Training Equipment

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Objectives*

- Procure 2M equipment upgrades
- Facilitate 2M aboard submarines
- Establish repair capability for BGAs & ceramic substrata
- Improve quality of hand tools
- Team building within 2M community

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Accomplishments*

- Chaired/served on IPC committees for repair standards
  - IPC-7711, Rework of Electronic Assemblies
  - IPC-7721 Repair and Modification of Printed Boards and Electronic Assemblies

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Accomplishments*

- IPC-7070 series—requirements for component mounting
  - IPC-7071 - General Requirements
  - IPC-7072 - Through-hole
  - IPC-7073 - Standard Surface Mount Technology
  - IPC-7074 - Fine Pitch and High Pin Count
  - IPC-7075 - Fine Pin Count Area Array
  - IPC-7076 - Chip Scale and Chip Size
  - IPC-7077 - Wire Bonding Bare Chip
  - IPC-7078 - Flip Chip (Direct Chip Attach)

*Overview*



# *Accomplishments*

- Major revision of Standard Practices Manual
  - Parallel with curricula updates
  - Incorporates new Government/industry standards

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Accomplishments*

- Certification Plan published
- Procured
  - PRC-2000THs
  - Mini station microscopes
  - ESD constant monitoring stations
  - Portable kits

*Overview*



2M Miniature/Microminiature Electronic Repair Program



# *Accomplishments*

- Submarine deployments progressing (maybe)
- Exported training started
- TF-500 deployments underway
- New pliers & cutters procured

*Overview*



2M Miniature/Microminiature Electronic Repair Program

# *Topics*

- Overview
- **Tools and Equipment**
- Technical Documentation
- Training and Training Support
- Wrap-up

## *Tools and Equipment*



# *Tools and Equipment*

- PRC-2000TH
- Microscopes for Mini
- Portable 2M Station
- ESD Constant Monitoring
- TF-500

# *PRC-2000TH*

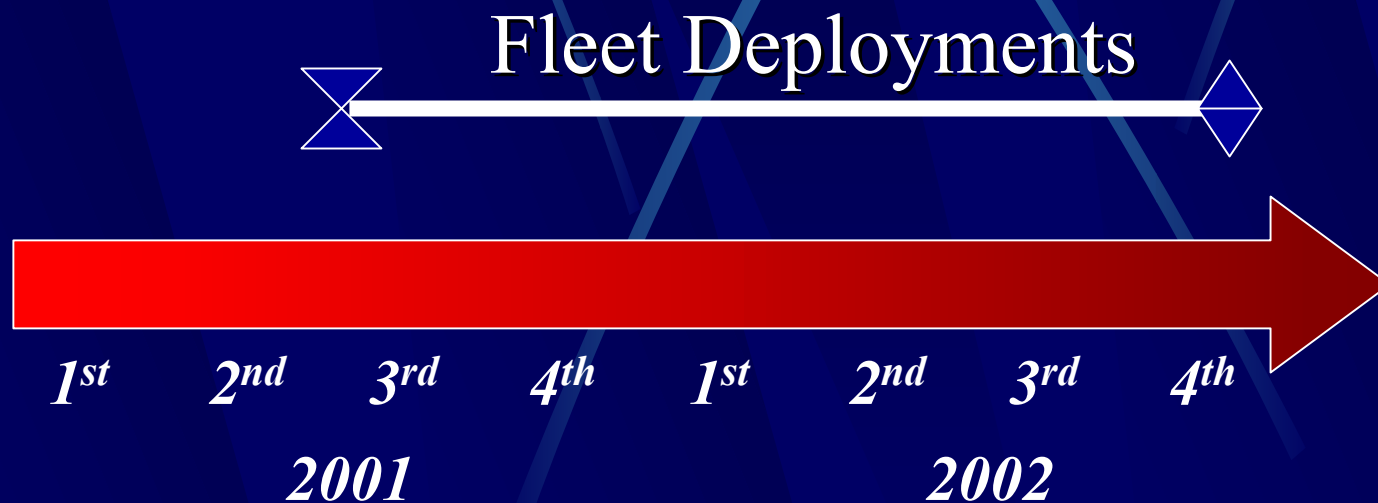
- Replaces PP-8087
- Same as PRC-2000 (less SMT)
- Deployments started
  - Schools completed
  - Fleet established priority via FTSC
- 54 planned for FY01



*Tools and Equipment*



# *PRC-2000TH Schedule*



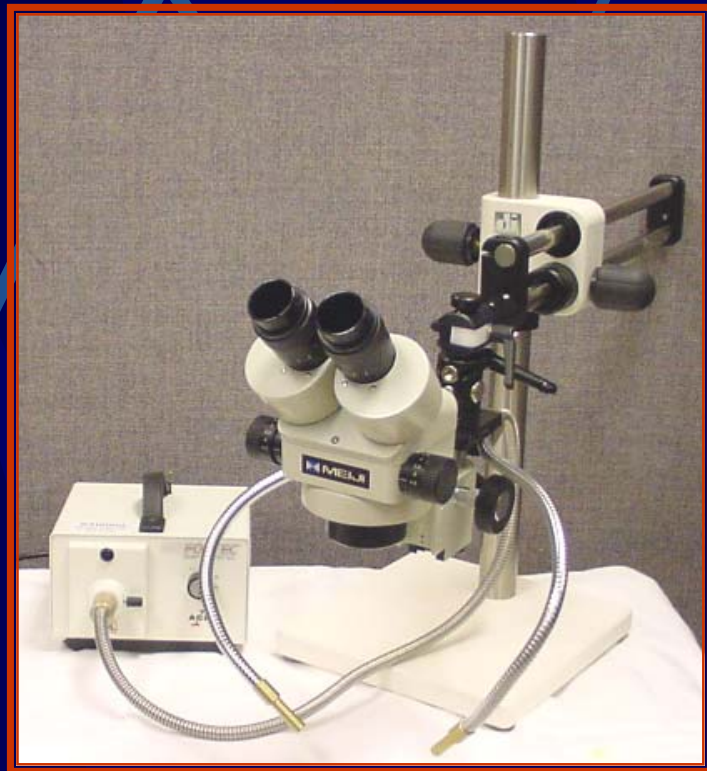
*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *Microscopes*

- Upgrade to mini capability
- Deployments started
  - Schools completed
  - Fleet established priority via FTSC
- 54 planned for FY01

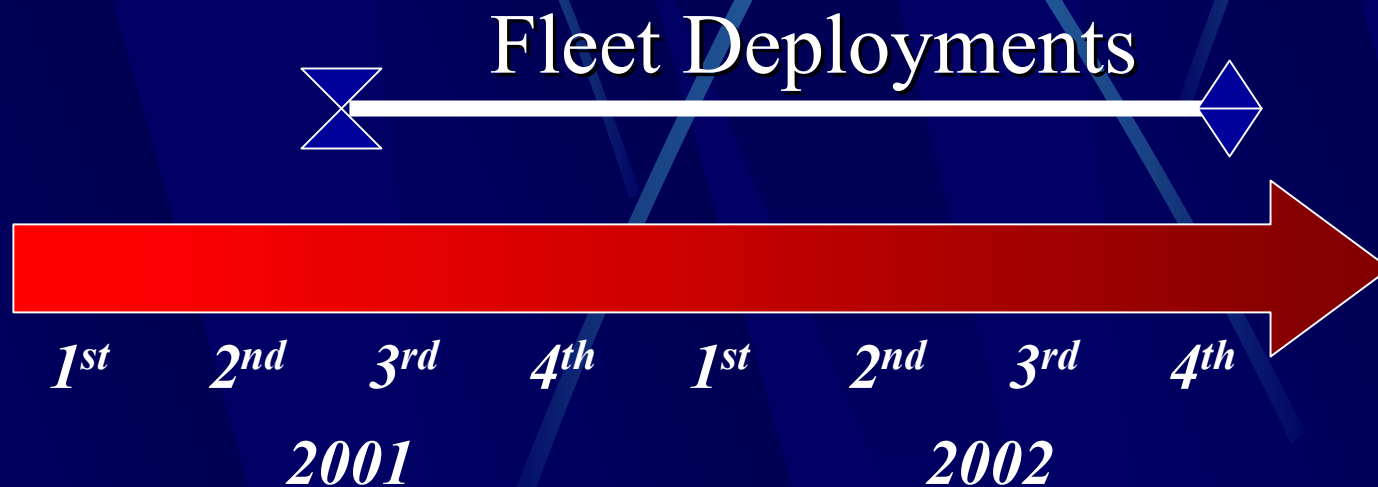


*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *Microscope Schedule*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program



# *Portable Tool Kit*

- Pace MBT-250
- Subset 2M AEL
- >2 ft<sup>3</sup> storage
- No microscope



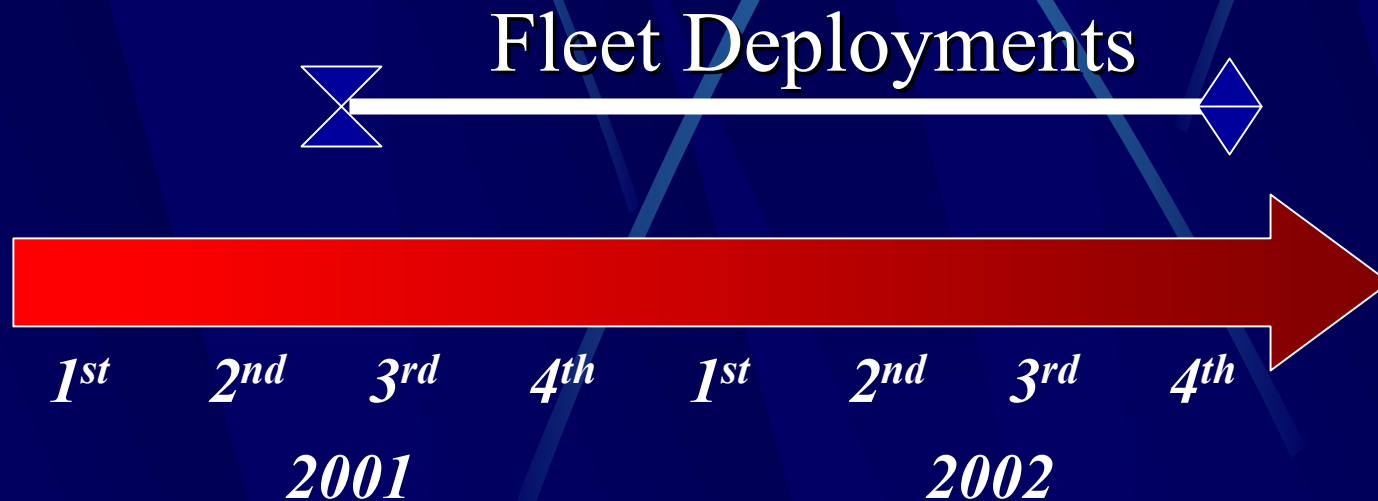
*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program



# *Portable Kit Schedule*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *MARCOR Portable Variation*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *ESD Constant Monitoring*

- Provides instantaneous feedback
- > 50% of CCA failures attributed to ESD
- 200 planned for FY01
- NUWC to buy for MTR

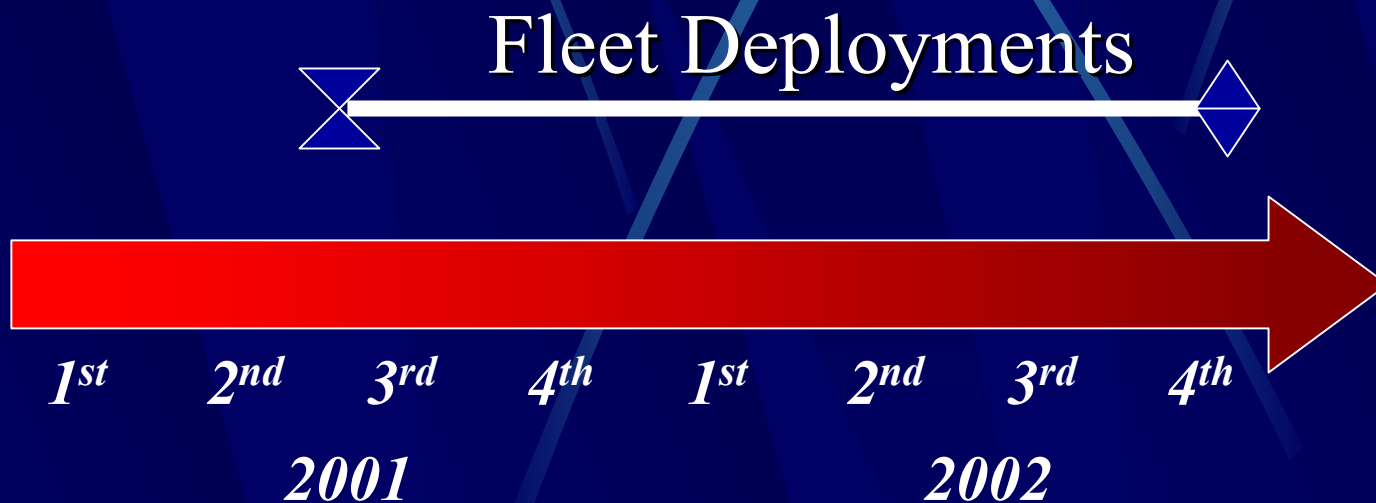


*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *ESD Schedule*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *Pliers and Cutters*

- Quality deteriorating
- No longer suitable for 2M



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program



# *Pliers and Cutters*

- Evaluated known brands
- Excelta®
- Expensive
- American made

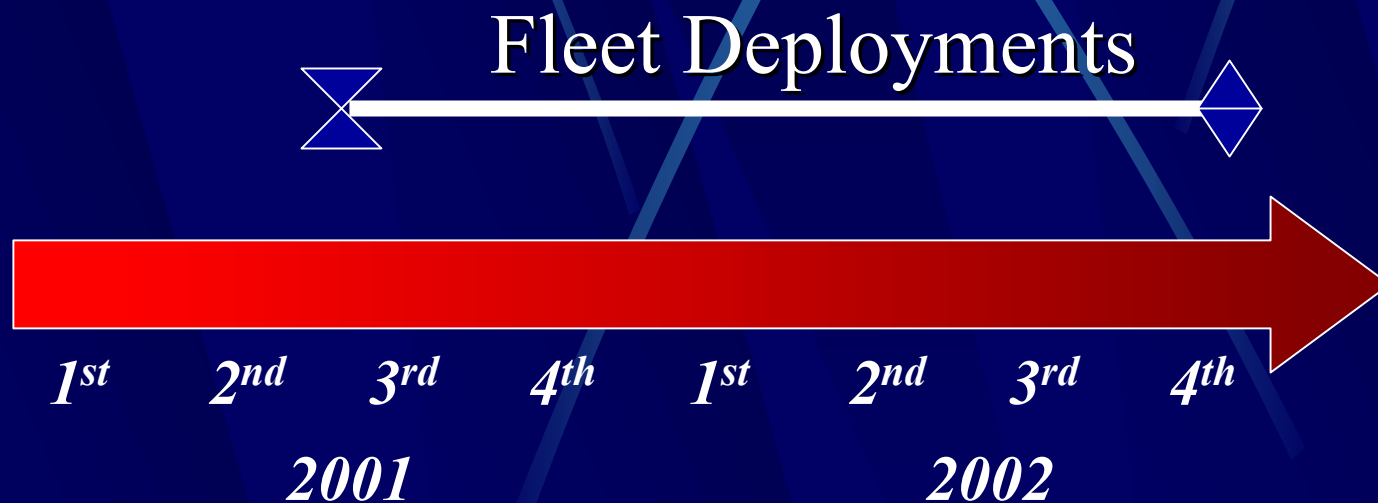


*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *Pliers & Cutters Schedule*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *Deployment Plan*

- CV/CVN PACFLT
  - 2 MC + 1 Portable
- CV/CVN LANTFLT
  - 1 MC + 2 MN + 1 Portable
- AS
  - 2 MC + 1 Portable
- AGF/CG/DDG/DD/LCC  
LHA/LHD/LSD41/MCS
  - 1 MC + 1 Portable
- AOE/FFG
  - 1 MC
- LPD/LSD36/LST
  - 1 MN
- ARS/MCM
  - 1 Portable

## *Tools and Equipment*





# TF-500

- Pace ThermoFlo
- Standard pitch BGAs
  - ~ 30 mil pitch
- High density SMT
  - ~ 20 mil pitch
- Ceramic boards



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *QuickFit Nozzles*

- 72 standard QuickFit nozzles
- BGA-18 (smallest)
  - 8.64mm x 8.90mm  
(0.34" x 0.35")
- BGA-720 (largest)
  - 47.5mm x 47.5mm  
(1.87" x 1.87")



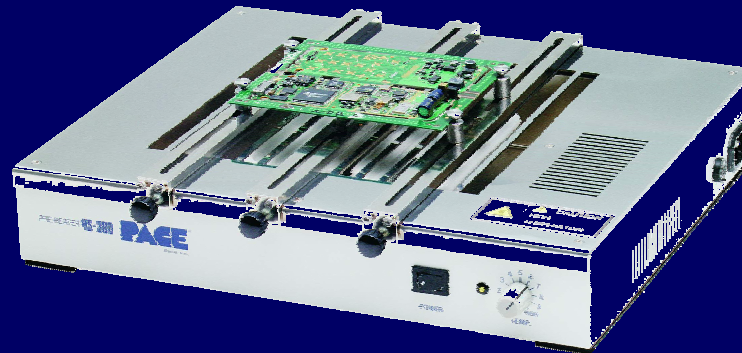
*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# New *HS 300*

- Radiant (IR) Heating Source
- Effective on High Mass PCBs
- Even Heating over wide area
- Prevents warping on large PCBs



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *TF-500s Deployed*

- TRF Kings Bay (Saber Radio)
- SIMA Norfolk (AN/SPY-1)
- ATRC Dahlgren (AN/SPY-1)
- NSSF New London (AN/BSY-1)
- NAVIMFAC PAC Northwest
- SIMA San Diego (AN/SPY-1)
- SRF Yokosuka (AN/SPY-1)

*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program



# *TF-500 Training at SRF Yoko*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

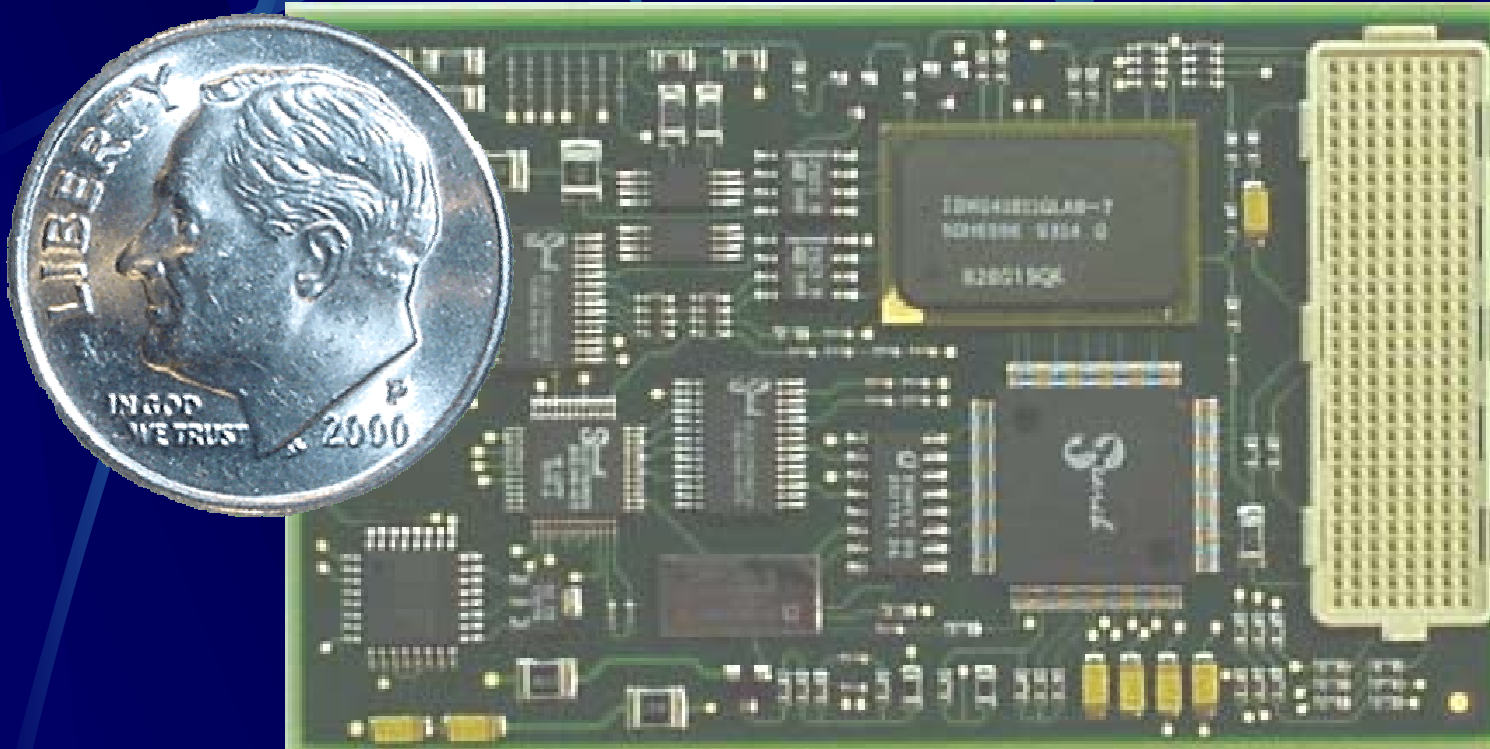
# *TF-500s Planned*

- IMF Pearl Harbor (4 SEP 01)
- SIMA Mayport (TBD)
- Others?

*Tools and Equipment*



# *New Technologies*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *ESD*

- Up to 50% of latent failures induced by ESD
- Solutions
  - ESD Constant Monitoring
  - ESD Safe Containers

*Tools and Equipment*





# *ESD Safe Containers*



*Tools and Equipment*



2M Miniature/Microminiature Electronic Repair Program

# *ESD*

- Up to 50% of latent failures induced by ESD
- Solutions
  - ESD Constant Monitoring
  - ESD Safe Containers
  - Identification of gaps
  - Training, training, training

*Tools and Equipment*



# *ESD Training*

- Update ESD module in A-100-0072
  - Video to be done in conjunction with USAF
- Train ourselves--sessions with
  - 2M schools
  - FTSCs
  - NUWC Det
- Train the fleet (all levels)
  - First sessions with CPF in Pearl Harbor

*Tools and Equipment*



# *Topics*

- Overview
- Tools and Equipment
- **Technical Documentation**
- Training and Training Support
- Wrap-up

## *Technical Documentation*



# *Technical Documentation*

- Standard Practices Manual
- Equipment Technical Manuals
- Allowance Lists
- Navy Training Plan
- Certification Plan
- Database and Web Page

*Technical Documentation*



# *Technical Documentation*

- 2M documentation now ATIS compliant
  - “Advanced Technical Information System”
- ATIS CD available
- Also posted on
  - 2M web site
  - NSWC Port Hueneme web site
  - NATEC web site
  - “Sailor to Engineer”/Distance Support
  - Cert plan on Gold Disk CD

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *Standard Practices Manual*

- Revision is needed
  - Incorporate electro-plating (WP 17), jumper wires, multi-layer plated through-hole repair
  - IPC-A-610C & J-STD-001C
  - Fleet input
  - Started Feb 01

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program



# *PRC-2000 Tech Manual*

- Revision is needed
  - Incorporate new handpieces
    - PS-80 Soldering Iron
    - SX-80 Solder Extractor
  - Not started

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# ***MBT-250 Tech Manual***

- Under development
- Similar to PRC-2000 technical manual
  - Compilation of commercial manuals
    - Operators
    - Service
    - PS-80
    - SX-80
    - TJ-70

***Technical Documentation***



# ***PRC-2000 APL***

- Distributed final to Instructors/ FTSC 2M Field Service Eng.s (3/01)
- Update in progress (ICAPs)
  - PS-80
  - SX-80

***Technical Documentation***



2M Miniature/Microminiature Electronic Repair Program

# ***2M AEL***

- Requires some updates
- Process tortuous

***Technical Documentation***



**2M** Miniature/Microminiature Electronic Repair Program

# *Portable Kit APL*

- Draft complete
- Assigning stock numbers

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *Portable Kit ULSS*

- Will start after MBT-250 Tech Manual
- Expect draft this FY

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *TF-500 ULSS*

- Planned draft this FY

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program



# *Navy Training Plan*

- NTP S-30-8711A published 3/97
- Updated to include submarines
- Draft provided to NAVSEA
- Additional changes identified

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *Certification Plan*

- Revision required
- Potential changes
  - USCG inclusion
  - “Real” NAVAIR number
  - Utilization as certification criteria
  - Interval standardization between PAC and LANT
  - MTR review at training sites

*Technical Documentation*



# *Database*

- <https://acrux.m42.crane.navy.mil/>
  - Index page for 2M Information
  - Database, tool lists, NTP Master Activities List, review copy of documents under revision, APLs

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *NMCI*

*Technical Documentation*



2M Miniature/Microminiature Electronic Repair Program

# *Program Server under NMCI*

- Pay for one, not two servers
- Common database
- Development team
  - NUWC
  - Crane
  - FTSCCLANT
  - FTSCPAC
  - NAVSEA

*Technical Documentation*



# *Topics*

- Overview
- Tools and Equipment
- Technical Documentation
- **Training and Training Support**
- Wrap-up

*Training*



# *Training Sites*



A map of the United States is shown in a light blue color against a dark blue background with diagonal lines. Various training sites are labeled across the map in white text. The labels are as follows:

- NTGD Atsugi
- ATG Yokosuka
- NTGD Whidbey Island
- FTC San Diego
- NADEP North Island
- Davis-Monthan AFB
- ATG Pearl Harbor
- Spangdahlem AB
- FTC Norfolk
- NADEP Cherry Point
- NADEP Jacksonville
- FTC Mayport
- FTC Yorktown

*Training*



2M Miniature/Microminiature Electronic Repair Program



# *Training*

- Curricula
- Training Support
  - MMDT and TTE
  - Yokosuka Classroom
  - Whidbey Expansion
  - Exported Training
  - FTC Mayport

*Training*



2M Miniature/Microminiature Electronic Repair Program

# *Curricula Update Status*

- Miniature Repair Course (A-100-0072)
- Microminiature Repair Course (A-100-0073)
- 2M Instructor Courses (A-100-0135 & 0136)
- 2M Technician Recertifier Course (A-100-0058)
- 2M Recertifier Requalification (A-100-0144)

# *Plastic Panel Repair*

- Special thanks to
  - Major Victor Ambrose of NADEP Cherry Point
  - Davis-Monthan AFB

*Training*



2M Miniature/Microminiature Electronic Repair Program

# ***MMDT***

- Miniature/Microminiature Display Trainer
- Current units wearing out

***Training***



2M Miniature/Microminiature Electronic Repair Program

# *MMDT Alternatives*

- SuperScope 2000
- Sunnex InspectaCam®
- Dazor ScreenLens™  
Magnifier
- Standalone video  
camera w/zoom
- Meiji microscope  
w/camera



*Training*



# *Universal Power Cords*

- Used with PRC-2000
- Easy to break
- Hard to repair
- Expensive to replace
- Potential solution
  - Buy one for each handpiece
  - Cost about \$10K

*Training*





# *Yokosuka Classroom*

- Joint 2M/MTR classroom
- TTE installed last summer
  - Twelve MTR seats
  - Eight 2M seats
- One classroom remains at Atsugi
- Ventilation still an issue



*Training*



2M Miniature/Microminiature Electronic Repair Program

# *Whidbey Expansion*

- Consistently has standby list
- NAVSEA approved two additional seats
- TTE installed



*Training*



2M Miniature/Microminiature Electronic Repair Program

# *ATG MIDPAC Upgrade*



*Training*



2M Miniature/Microminiature Electronic Repair Program



# *Exported Training*

- Portable 2M kit
- Targeted to submarines
  - SUBASE Bangor (TRF)
  - SUBASE Kings Bay (TRF)
  - SUBASE New London
- Ingleside for MCM support



New London

*Training*



2M Miniature/Microminiature Electronic Repair Program

# *FTC Mayport*

- Converted all instructors from military to civilian
- Four new hires requiring work-up
- Made two courtesy visits
- Should be ready to recert 1 Oct

*Training*



2M Miniature/Microminiature Electronic Repair Program

# *HAZMAT in the Classroom*

- Laws vary state to state
- Liability varies state to state
- Must ensure:
  - Classroom meets or exceeds local requirements
  - Students are aware of differences

# *Topics*

- Overview
- Tools and Equipment
- Technical Documentation
- Training and Training Support
- **Wrap-up**

*Wrap-up*





# *Summary*

The 2M Program addressed the

- Tools and Equipment
- Technical Documentation
- Training & Training Support

to ensure that the Fleet has a first-rate and effective repair capability!

*Wrap-up*



2M Miniature/Microminiature Electronic Repair Program

# *Focus for Next Year*

- Keeping technically current
- Pushing equipment to the Fleet
- Submarine support
- Documentation updates
- Keeping training first-rate
- Improving overall Fleet support

*Wrap-up*



# *Focus for Next Year*

- USCG integration
- Build on relationship with USAF
- Refine relationship with USMC
- Establish a relationship with USA

*Wrap-up*



# *Program Issues*

- NAVAIR integration
- US Army participation
- Deployment plan
- Certification plan
- TTE
  - MMDT
  - Universal power cords
  - HAZMAT in the classroom
- ESD understanding

*Wrap-up*

